

244LVP Levelstar Intelligent Buoyancy Transmitter for Liquid Level, Interface and Density - Communication HART and Foundation Fieldbus -



The intelligent transmitter 244LVP is designed to perform continuous measurements for liquid level, interface or density of liquids in the process of all industrial applications. The measurement is based on the proven Archimedes buoyancy principle and thus extremely robust and durable. Measuring values can be transferred analog and digital. Digital communication facilitates complete operation and configuration via PC or control system. The 244LVP measures with consistent reliability and high precision. For installations in contact with explosive atmospheres up to Zone 0, certificates are available. The 244LVP combines the abundant experience of FOXBORO with most advanced digital technology.

FEATURES

- HART Communication, 4 to 20 mA, or FOUNDATION Fieldbus
- Configuration via FDT-DTM
- Multilingual full text graphic LCD
- IR communication as a standard
- Easy adaptation to the measuring point without calibration at the workshop
- Linear or customized characteristic with 32 points
- Approved for SIL applications (with HART)
- Local display in %, mA or physical units
- Signal noise suppression by Smart Smoothing
- Continuous self-diagnostics
- Linear or customized characteristic
- Process temperature from -50 °C to +150 °C
- Static pressure up to PN 150, class 900
- Micro sintermetal sensor technology

Life Is On

Foxboro™
by Schneider Electric

TECHNICAL DATA

Data refer to the sensor material Type 316L (1.4404)

Explosion protection certificates must be observed!

Input / Output

Measuring ranges 50 mm to 15 m, upper and lower range value continuously adjustable

Standard lengths of

Displacer (204DE) 300 .. 3000 mm, 12 .. 118 in; further lengths on request

| | PN 40 | PN 40 (> 2.5 kg), PN 150 |
|--------------------------------|-----------|-----------------------------|
| Weight force lower range value | 25 N | 40 N |
| Weight force upper range value | 5 N | 5 N |
| Measuring span | 2 .. 20 N | 3.4 .. 34 N |
| on request | | 2 N |

Span ratio

Turn-down 1:1 .. 1:10 (1:20 on request)

Accuracy ¹⁾ $\pm 0.2\%$; increased accuracy with customized adjustment

Transfer function linear or customized with up to 32 setpoints

Configuration

- with FDT-DTM per HART protocol

- via 2-wire connection 4 .. 20 mA
- via IR communication

- with multi-lingual, full graphic LCD display with %, mA, physical units and 2 from the outside-to-use buttons

Load $R_{Bmax} = (U_S - 12V) / 23mA$

Communication HART

Connection Two-wire system

Supply voltage U_S ²⁾ > 12 V + $R_b \cdot 0.024A$

R_b is the total burden resistor for lines, HART measurement resistor and communication.

Current sink max. 24 mA

Signal range 4 to 20 mA

Operating range 3.8 to 20.5 mA (acc. NE 43)

Critical error alarms in the

2-wire Communication < 3.6 mA and > 21 mA

HART Protocol

- 2-wire 1200 Baud, HART compliant

- IR communication 19200 Baud

Communication Hardware

- Handterminal HT 375/475

- PC Software WIN xx and FDT/DTM

Communication FOUNDATION Fieldbus H1

Connection twisted and shielded two wire cable acc.to recommendation based on IEC 1158-2

Supply voltage U_S : 9 .. 30 V DC³⁾, $V_{pp} \leq 1\%$

Operating current $10.5mA \pm 0.5mA$ (base current)

Digital communication FF specification ITK Profile 6, Link-Master (LAS), funktion blocks 2AI, PID, IS, OS, AR

Signal amplitude $\pm 8mA$

Fault current $\leq 13mA$

Operating values according to IEC 1158-2

Bus connection Fieldbus interface based on IEC 1158-2

Power supply Power supply is achieved dependent on the application by means of segment coupler

File the actual file can be downloaded from our homepage

Configuration

Software National Instruments NI-FBUS Configurator

Hardware FBUS interfaces from National Instruments (USB-FBUS and PCMCIA-FBUS)

Control systems FOUNDATION Fieldbus H1 compatible

Failure handling

Substitute value last value or safety value

Safety value adjustable -110 .. +110 % of out

Reset substitute value automatically or manual

1) Accuracy acc. ANSI / ISA - S51.1 - 1979

2) U_S (max) with explosionproof device < 30 V, otherwise < 42 V

3) With explosionproof device 9 .. 24 V DC

Operating conditions¹⁾

Process temperature -50 °C ... +150 °C
 Pressure rating
 acc. to DIN PN 16, 40, 63, 100, 150
 acc. to ANSI Class 150, 300, 600, 900
 Ambient temperature²⁾ -40 °C ... +70 °C³⁾
 Relative humidity up to 100 %
 Condensation permitted
 Transportation-
 storage temperature. -40 °C ... +85 °C
 Protection IP 66 (acc. DIN 40 050)
 The device can be operated at a class D2 location in accordance with DIN IEC 654, part 1.

Operation condition effects

Ambient temperature -10 °C ... +70 °C
 Zero. < 0.1 % / 10 K⁴⁾
 Span < 0.07 % / 10 K
 Total

$$(0.1 \frac{\text{max. sp.}}{\text{adjusted sp.}} \pm 0.07 \frac{\text{measured value}}{\text{adjusted sp.}}) \% / 10K$$

 (sp. = measuring span)
 <-10 °C / > +70 °C twice the value
 Process temperature < 0.1 % / 10 K⁹⁾
 Operating pressure no influence (vacuum resistant)

Transitional behavior

Dynamic behavior
 Damping (90 %-time) 0 ... 32 s
 Switch-on time 7 s
 Step response (63 %-time)
 with damping 0 s 250 ms
 Update rate 10 / s
 Long term stability < 0.2 % / 6 months at 20°C⁹⁾
 Noise suppression
 Common mode voltage < AC 250 V_{eff}
 Common mode rejection 120 dB
 Series mode rejection 50 dB
 Filter Smart Smoothing

- 1) Not with all materials - see Table of Comparison of Materials page 6
- 2) -50 °C on request
- 3) Display not readable at T < -20 °C or T > +70 °C
- 4) For max. measuring span

Materials (Table of Comparison see page 6)

| | |
|-----------------------------|---|
| Sensor | |
| Measuring cell | 316L (1.4404 / 1.4435) |
| Fill fluid | silicone oil |
| Filling volume. | appox. 0.3 cm ³ |
| Displacer 204DE | 316L (1.4404 / 1.4435), PTFE, PTFE with 25% carbon or Hastelloy C |
| Suspension | 316L (1.4404 / 1.4435 / 1.4436) |
| Connection flange | 316Ti (1.4571) (other on request) |
| Amplifier housing | Aluminium (Alloy No GD-Al Si 12), Polyurethan coated, or Stainless Steel 316L (1.4404) |

For Sour Gas applications according to NACE Standard
MR-0175-2003:

| | |
|---------------------|------------------------|
| Diaphragm | 316L (1.4404 / 1.4435) |
| Flange | 316Ti (1.4571) |

Mounting

| | |
|---------------------------|------------------------|
| Mounting method | flange mounted |
| acc. DIN | DN 50, DN 80, DN 100 |
| acc. ANSI | 2 inch, 3 inch, 4 inch |

Weight

| | |
|-----------------------|-------------------|
| Transmitter | see table page 6 |
| Displacer | see table page 10 |

Electrical connection

| | |
|--|--|
| Cable entry thread | M20x1.5 or 1/2-14 NPT |
| Cable gland and screwed sealing plug have to be ordered separately under model code BUSG ... | |
| For equipment in Ex d version, 1 screwed sealing plug made of stainless steel is included in delivery. | |
| Screw terminals | wire cross-section up to 2.5 mm ² |
| Test sockets | Ø 2 mm |

Electromagnetic compatibility EMC

| | |
|--|--|
| Operating conditions | industrial environment, measuring instruments, living area |
| Immunity and Emission according to | |
| EN 55011 / IEC - CISPR 11 | 2011-4 fulfilled |
| EN / IEC 61000-4-2, 3, 4, 5, 6, 11 | 2011-9 fulfilled |
| EN / IEC 61000-6-2, 3, 4 | 2011-9 fulfilled |
| EN / IEC 61326-1 | 2006-10 fulfilled |
| NAMUR recommendation NE 21 | 2012 fulfilled |

SAFETY REQUIREMENTS**CE Label**

| | |
|--|----------------|
| Electromagnetic compatibility | 2004/108/EG |
| Low-voltage regulation | not applicable |
| Explosion protection acc to ATEX | 94/9/EG |

Safety

| | |
|---|--|
| According to EN 61010-1 (resp. IEC 1010-1) | safety class III |
| Internal fuses | none (or not replaceable by customer) |
| External fuses | Limitation of power supplies for fire protection have to be observed due to EN 61010-1, appendix F (rsp. IEC 1010-1) |

Electrical classification ATEX^{1) 2)}**Explosion-proof:**

| | | | | |
|--------|---------|-----------------------|--------------------|--------|
| AD 931 | Housing | II 2 G Ex d IIC T6 Gb | PTB 02 ATEX 1025 X | Zone 1 |
|--------|---------|-----------------------|--------------------|--------|

Intrinsic safe and auxilliary protection:

| | | | | |
|--------|---------|--------------------------|--------------------|--------|
| AID421 | Housing | II 2 G Ex d ia IIC T6 Gb | PTB 04 ATEX 2011 X | Zone 1 |
|--------|---------|--------------------------|--------------------|--------|

Zone 2:

| | | | | |
|---------|------------------|----------------------------|----------------------------|--------|
| AID 421 | HART electronics | II 3 G Ex ia(ib) IIC T4 Gc | Manufacturer's Declaration | Zone 2 |
|---------|------------------|----------------------------|----------------------------|--------|

International Certificates**FM Certification ***

Intrinsically Safe
 Nonincendive
 Explosion proof
 Dust-Ignitionproof / II, III / 1 / EFG / T6

- Further protection types of on request -

* pending

1) With appropriate order only

2) National requirements have to be observed

TABLE OF MATERIALS

Comparison of Material

| Code | WNr | DIN | Remarks | equivalent to |
|---------------------|-----------|--------|--|------------------|
| X6 CrNiMoTi 17 12 2 | 1.4571 | 17 440 | | ~ ASTM Typ 316Ti |
| X2 CrNiMo 17 13 2 | 1.4404 | | | |
| X2 CrNiMo 18 14 3 | 1.4435 | | | ASTM Typ 316L |
| X5 CrNiMo 17 13 3 | 1.4436 | | | |
| NiMo 16 Cr 15 W | 2.4819 | 17 744 | equivalent to Hastelloy C-276 VdTÜV - Wbl. 400 | UNS N 12 276 |
| GD - AISI 12 | 3.2582.05 | 17 007 | Al - Diecasting | |

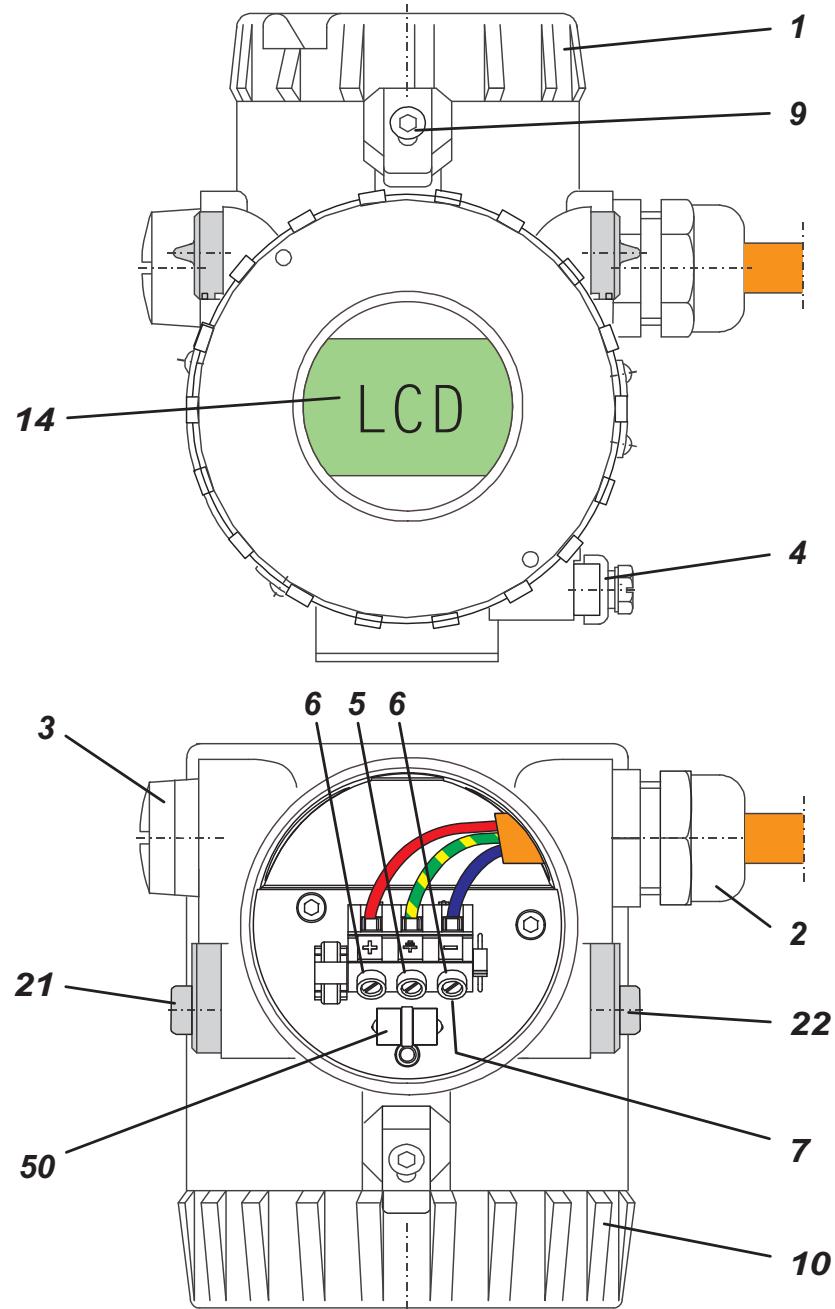
Service Limits 244LVP

| Nominal pressure | | 316 / 316L (1.4404 / 1.4571) | | |
|------------------|----------------|--|-------------|------|
| | | Max. operating pressure in bar at temperature in °C | | |
| | | -50 ... -10 | -10 ... +50 | +150 |
| DIN | PN 40 DIN 2635 | 40 | 40 | 34 |
| | PN 63 | 63 | 63 | 53 |
| | PN 100 | 100 | 100 | 86 |
| | PN 160 | 150 | 150 | 134 |
| ANSI | Class 150 | 19 | 18 | 15 |
| | Class 300 | 49 | 49 | 40 |
| | Class 600 | 99 | 99 | 75 |
| | Class 900 | 148 | 148 | 114 |

Table of Weights

| Transmitter, with flange | Weight [kg] | | | | | | | | | |
|-----------------------------|-------------|-----|-----|------|------|------|------------|-----|------|------|
| | DIN PN | | | | | | ANSI Class | | | |
| | 16 | 25 | 40 | 63 | 100 | 160 | 150 | 300 | 600 | 900 |
| DN 50 / 2 inch | 4.9 | 4.9 | 4.9 | - | - | - | 4.5 | 5.5 | - | - |
| DN 80 / 3 inch | 7.2 | 7.2 | 7.2 | 7.6 | 9.7 | 10.3 | 7.4 | 9.2 | 9.2 | 13.7 |
| DN 100 / 4 inch | - | 7.7 | 7.7 | 10.7 | 14.2 | 15.5 | 7.6 | 7.6 | 18.3 | 22.6 |

CONNECTIONS, OPERATIONAL ELEMENTS



- 1** Cover for terminal compartment
- 2** Cable gland (as ordered)
- 3** Plug, interchangeable by Pos. **2**
- 4** External ground connection
- 5** Internal ground connection
- 6** Terminals (+ / -)
- 7** Test sockets Ø 2 mm integrated in terminals
- 9** Security lock for Ex d version

- 10** Cover for amplifier housing (with local display)
- 14** LCD indicator shows
Measuring variable
Engineering unit and
Messages
- 21** Local key 1 for local operation
- 22** Local key 2 for local operation
- 50** Overvoltage protection

MODEL CODES 244LVP

| | | | | | | | | | |
|---|--------|----|--|--|--|--|--|-----|--------|
| Intelligent Buoyancy Transmitter with Displacer | 244LVP | | | | | | | | 161014 |
| Flange Material: (Process wetted) | | -S | | | | | | | |
| 1.4571 (316Ti) | | -S | | | | | | | |
| Sensor Material: (Process Wetted) | | S | | | | | | | |
| 316L / 1.4435 / 1.4404 | | S | | | | | | | |
| Flange Size | | | | | | | | | |
| DN 50 | | | | | | | | | 5 |
| DN 80 | | | | | | | | | 8 |
| DN 100 (PN 25 / PN 40 only) | | | | | | | | | 9 |
| 2-Inch | | | | | | | | | 2 |
| 3-Inch | | | | | | | | | 3 |
| 4-Inch | | | | | | | | | 4 |
| Flange Pressure Rating & Contact Face | | | | | | | | | |
| PN16 to PN40, B1 (DIN EN 1092-1) | (a) | | | | | | | | B1 |
| PN16 to PN40, B2 (DIN EN 1092-1) | (a) | | | | | | | | B2 |
| PN63, B2 (DIN EN 1092-1) | (r) | | | | | | | | B3 |
| PN100, B2 (DIN EN 1092-1) | (r) | | | | | | | | B4 |
| PN160, B2 (DIN EN 1092-1) | (r) | | | | | | | | B5 |
| PN16 to PN40, D (DIN EN 1092-1) | (a) | | | | | | | | D1 |
| PN63, D (DIN EN 1092-1) | (r) | | | | | | | | D2 |
| PN100, D (DIN EN 1092-1) | (r) | | | | | | | | D3 |
| PN160, D (DIN EN 1092-1) | (r) | | | | | | | | D4 |
| ANSI Class 150, RF RF/SF (RF125) | (b) | | | | | | | | R1 |
| ANSI Class 300, RF RF/SF (RF125) | (c) | | | | | | | | R2 |
| ANSI Class 600, RF RF/SF (RF125) | (s) | | | | | | | | R3 |
| ANSI Class 900, RF RF/SF (RF125) | (s) | | | | | | | | R4 |
| ANSI Class 150, RJF | (b) | | | | | | | | J1 |
| ANSI Class 300, RJF | (c) | | | | | | | | J2 |
| ANSI Class 600, RJF | (s) | | | | | | | | J3 |
| ANSI Class 900, RJF | (s) | | | | | | | | J4 |
| Version | | | | | | | | | |
| Base Version LEVELSTAR | | | | | | | | N | |
| Cable Entry | | | | | | | | | |
| M20x1.5 without Cable Gland | | | | | | | | M | |
| 1/2-14 NPT without Cable Gland | | | | | | | | N | |
| Communication | | | | | | | | | |
| HART | | | | | | | | H | |
| FOUNDATION Fieldbus H1 | (o) | | | | | | | B | |
| Electrical Classification | | | | | | | | | |
| ATEX intrinsic safe, Zone 1 - IIC T4 | | | | | | | | 1C4 | |
| ATEX intrinsic safe, Zone 1 - IIC T6 | | | | | | | | 1C6 | |
| ATEX intrinsic safe, Zone 2 - IIC T4 | | | | | | | | 2C4 | |
| ATEX intrinsic safe, Zone 2 - IIC T6 | | | | | | | | 2C6 | |
| ATEX intrinsic safe Zone 1 - IIB T6 | | | | | | | | D1B | |
| ATEX explosionproof, Zone 1 - IIC T6 | | | | | | | | D1C | |
| FM Nonincendive | (m) | | | | | | | NFM | |
| FM Explosionproof | (d) | | | | | | | FDZ | |
| GOST-R Intrinsically Safe Zone 1 - IIC T6 | | | | | | | | GA1 | |
| GOST-R Intrinsically Safe Zone 2 - IIC T6 | | | | | | | | GA2 | |
| GOST-R explosion proof Zone 1 - IIC T6 | | | | | | | | GD1 | |
| Nepsi Intrinsically Safe T6 | (d) | | | | | | | NA6 | |
| Nepsi explosion proof | (d) | | | | | | | NDZ | |
| Brasil Intrinsically Safe T6 | (d) | | | | | | | BA6 | |
| Brasil explosion proof | (d) | | | | | | | BDZ | |

(continued on next page)

MODEL CODES 244LVP (continued)

| | | | |
|--|------------------|-----|--|
| Electrical Classification (cont'd) | | | |
| CSA Explosionproof | (m)(d) | CDZ | |
| FM Intrinsically Safe | (m) | FAA | |
| CSA Intrinsically Safe | (d) | CAA | |
| For General Purpose Areas, not Explosionproof | | ZZZ | |
| OPTIONS | | | |
| Housing Complete Stainless Steel Without External Pushbuttons | | -H | |
| External Pushbuttons for Maintenance | (n) | -M | |
| Interface measurement, Displacer >2.5 kg (5.5 lb) | (t) | -I | |
| Tag No. Labeling | | | |
| Stainless Steel Label Fixed With Wire | | -L | |
| Stainless Steel Label Fixed On Amplifier | | -F | |
| Certificates | | | |
| EN 10204-2.1, Certificate Of Compliance | | -1 | |
| EN 10204-2.2, Specific Test Report (Calibration) | | -2 | |
| EN 10204-3.1, Inspection Certificate Of Process Wetted Metallic Material | | -3 | |
| Comply with NACE Standard MR-01-75 | (e)(f) | -6 | |
| SIL 2 Certificate | | -Q | |
| Amplifier for selected code (244LVP-*****-X) | (n) | -X | |

- (a) Available with Flange Size 5, 8, 9
- (b) Available with Flange Size 2, 3, 4
- (c) Available with Flange Size 2, 3
- (d) Pending
- (e) Only with Sensor Material S
- (f) Restrictions concerning the limit of application for the used materials are considerable (NACE Standard MR-0175/2003, resp. ISO 15156-3)
- (i) Only with Electrical Classification 1C4, 1C6, D1B, D1C, 2C4, GA1, GA2, GD1, NA6, NDZ, BA6, BDZ, ZZZ
- (k) Pending for Version N 1C6, 1B6
- (m) Only Version N
- (n) Not with Options -H
- (o) With Electrical Classification D1B or ZZZ
- (r) Available with Flange Size 8, 9
- (s) Available with Flange Size 3, 4
- (t) Only with Flange Pressure and Contact Face: B1, B2, B3, B4, D1, D2, D3, J1, J2, J3, J4, R1, R2, R3, R4

Accessories for Transmitter 244LVP LevelStar: Displacer 204DE

Typical Dimensions and Weights for Density Ranges $\Delta \rho$ ¹⁾

| Material | 316L (1.4404 / 1.4435) ²⁾ | | | | | | | | | | | | PTFE / PTFE with 25 % C | | | Hastelloy C | | | | | | | | |
|-----------|--------------------------------------|-----------|-----------|---------|-------------------------------|-----------|-----------|--|--------------------------------|-------------------------|-----------|-----------|--------------------------------|-------------------------|-----------|-------------|--------------------------------|-------------------------|-----------|-----------|-----|--|--|--|
| | Code | | | | -S (PN 100) | | | | -T ³⁾ (PN 40 / 63) | | | | -S (PN 250) | | | | -S (PN 500) | | | | | | | |
| Len. L | Density Range $\Delta \rho$ | | | | | | | | | | | | | | | | | | | | | | | |
| | 250 ... 1500 kg/m ³ | | | | 300 ... 600 kg/m ³ | | | | 400 ... 2000 kg/m ³ | | | | 200 ... 1500 kg/m ³ | | | | 300 ... 1500 kg/m ³ | | | | | | | |
| ∅ mm | Vol. cm ³ | Wei. N | PN bar | ∅ mm | Vol. cm ³ | Wei. N | PN bar | $\rho_{min}^{4)}$ kg/m ³ | ∅ mm | Vol. cm ³ | Wei. N | PN bar | ∅ mm | Vol. cm ³ | Wei. N | PN bar | ∅ mm | Vol. cm ³ | Wei. N | PN bar | | | | |
| mm | | | | | | | | | | | | | | | | | | | | | | | | |
| 350 | 60.3 | 1000 | 19 | 100 | 101.6 | 2840 | 38 | 40 | 460 | 42.4 | 500 | 18 | 250 | 62 | 1056 | 23 | 500 | 60.3 | 1000 | 18 | 100 | | | |
| 500 | 48.3 | 920 | 17 | 100 | 88.9 | 3100 | 43 | 63 | 580 | 42.4 | 710 | 24 | 250 | 51 | 1021 | 23 | 500 | 48.3 | 920 | 19 | 100 | | | |
| 750 | 42.4 | 1060 | 21 | 100 | 76.1 | 3410 | 44 | 63 | 545 | 33.7 | 670 | 21 | 250 | 42 | 1039 | 24 | 500 | 48.3 | 1370 | 27 | 100 | | | |
| 1000 | 33.7 | 890 | 17 | 100 | 60.3 | 2855 | 41 | 63 | 545 | 26.9 | 570 | 18 | 250 | 35 | 961 | 21 | 500 | 33.7 | 890 | 19 | 100 | | | |
| 1200 | 33.7 | 1070 | 20 | 100 | 60.3 | 3425 | 48 | 63 | 675 | 26.9 | 680 | 22 | 250 | 35 | 1153 | 25 | 500 | 33.7 | 1070 | 22 | 100 | | | |
| 1500 | 26.9 | 850 | 16 | 100 | 51 | 3065 | 39 | 63 | 460 | 21.3 | 540 | 17 | 250 | 30 | 1060 | 24 | 500 | 26.9 | 850 | 18 | 160 | | | |
| 1800 | 26.9 | 1020 | 19 | 100 | 42.4 | 2540 | 38 | 63 | 495 | 21.3 | 640 | 20 | 250 | 28 | 1107 | 25 | 500 | 26.9 | 1020 | 21 | 160 | | | |
| 2000 | 26.9 | 1140 | 21 | 100 | 42.4 | 2825 | 41 | 63 | 565 | 21.3 | 710 | 22 | 250 | 25 | 981 | 22 | 500 | 26.9 | 1140 | 23 | 160 | | | |
| 2500 | 21.3 | 890 | 20 | 100 | 38 | 2840 | 37 | 63 | 425 | 17.2 | 580 | 16 | 250 | 22.5 | 993 | 23 | 500 | 21.3 | 890 | 23 | 160 | | | |
| 3000 | 21.3 | 1070 | 24 | 100 | 38 | 3400 | 45 | 63 | 575 | 17.2 | 700 | 23 | 250 | 20 | 942 | 22 | 500 | 21.3 | 1070 | 27 | 160 | | | |
| inch | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 60.3 | 1020 | 20 | 100 | 101.6 | 2885 | 38 | 40 | 455 | 42.4 | 510 | 18 | 250 | 62 | 1074 | 23 | 500 | 60.3 | 1020 | 18 | 100 | | | |
| 32 | 42.4 | 1150 | 23 | 100 | 76.1 | 3700 | 47 | 63 | 595 | 33.7 | 730 | 23 | 250 | 42 | 1126 | 26 | 500 | 33.7 | 720 | 16 | 100 | | | |
| 48 | 33.7 | 1090 | 20 | 100 | 60.3 | 3480 | 49 | 63 | 680 | 26.9 | 690 | 22 | 250 | 35 | 1171 | 26 | 500 | 33.7 | 1090 | 23 | 100 | | | |
| 60 | 26.9 | 870 | 16 | 100 | 51 | 3115 | 40 | 63 | 465 | 21.3 | 540 | 18 | 250 | 30 | 1076 | 24 | 500 | 26.9 | 870 | 18 | 100 | | | |
| 72 | 26.9 | 1040 | 19 | 100 | 42.4 | 2580 | 38 | 63 | 505 | 21.3 | 650 | 21 | 250 | 28 | 1124 | 26 | 500 | 26.9 | 1040 | 21 | 160 | | | |
| 84 | 26.9 | 1210 | 22 | 100 | 42.4 | 3000 | 44 | 63 | 635 | 21.3 | 760 | 23 | 250 | 25 | 1046 | 24 | 500 | 26.9 | 1210 | 25 | 160 | | | |
| 96 | 21.3 | 870 | 20 | 100 | 38 | 2765 | 37 | 63 | 420 | 17.2 | 570 | 16 | 250 | 22.5 | 968 | 22 | 500 | 21.3 | 870 | 23 | 160 | | | |
| 120 | 21.3 | 1090 | 25 | 100 | 38 | 3455 | 46 | 63 | 595 | 17.2 | 710 | 24 | 250 | 20 | 957 | 22 | 500 | 21.3 | 1090 | 25 | 160 | | | |

- $\Delta \rho = \rho_1 - \rho_2$
 ρ_1 = density of lower medium
 ρ_2 = density of upper medium

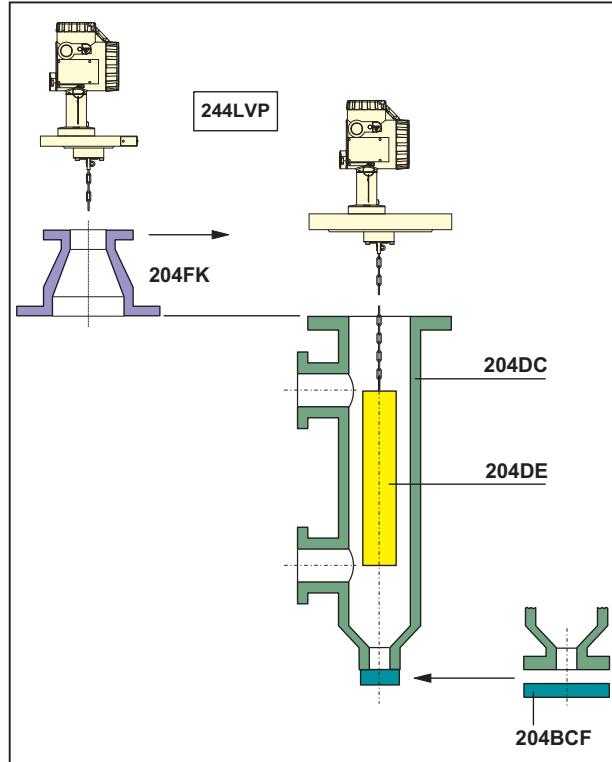
- Using displacer material 1.4571 can cause small deviations in diameter, volume and weight.
- For measurement of interface or density, the max. density of the lower medium is 1350 kg/m³.
- Min. density of the lower medium

If a Displacer Chamber is used, the difference between the diameter of the Displacer and the inside diameter of the Displacer Chamber must be at least 10 mm.

Lengths < 350 mm and > 3000 mm, and density ranges < 300 kg/m³ and > 2000 kg/m³ on request.

Accessories

For Displacer Chamber 204DC, Flange combination 204FK and Cover Flange Kit 204BCF see PSS EML0901, 204xx Accessories for Buoyancy Transmitter.



MODEL CODES 204DE**Displacer for Buoyancy Transmitters from 2N buoyancy up to 20N 204DE**

210814

RANGE OF APPLICATION: (a)

Liquid Level - Media: Liquid / Gas or Air
 (Density difference = 250 kg/m³ to 2000 kg/m³)
 (= 9x10⁻³ lbm/in³ to 72.2x10⁻³ lbm/in³) -S

Interface Level / Density - Media: Liquid 1 / Liquid 2
 (Density difference = 300 kg/m³ to 600 kg/m³)
 (= 10.8x10⁻³ lbm/in³ to 22.7x10⁻³ lbm/in³) (g)(h) -T

DISPLACER MATERIAL:

| | |
|---|---|
| 316L (1.4404 / 1.4435 / 1.4571) | S |
| 321 (1.4541) | H |
| PTFE (not for applications in Zone 0) | P |
| PTFE with 25% Carbon | O |
| Hastelloy C | C |
| Inconel 625 (2.4856) | R |
| Monel 400 (2.4360) | M |
| Titan (3.7035) | T |

PRESSURE RATING:

| | |
|-------------------------------------|---|
| Up to PN 100 / Class 600 | D |
| Up to PN 160 / Class 900 | E |
| Up to PN 250 / Class 1500 | F |
| Up to PN 500 / Class 2500 | G |

SUITABLE FOR FLANGE SIZE: (at Top of vessel/chamber)

| | |
|------------------|---|
| DN 50 | 0 |
| DN 70 | 1 |
| DN 80 | 2 |
| DN 100 | 3 |
| DN 150 | 4 |
| 2 inch | 5 |
| 3 inch | 6 |
| 4 inch | 7 |
| 6 inch | 8 |

DISPLACER LENGTH "L": (inches are approx.)**for Displacer Material codes P and O:**

| | |
|--|---|
| 300 mm (12 in) to 2000 mm (79 in) without partitioning | A |
| 2001 mm (79 in) to 4000 mm (157 in) One partition point | B |
| 4001 mm (157 in) to 6000 mm (236 in) Two partition points | C |
| 6001 mm (236 in) to 8000 mm (315 in) Three partition points | D |
| 8001 mm (315 in) to 10000 mm (394 in) Four partition points | E |
| 10001 mm (394 in) to 12000 mm (472 in) Five partition points | F |

for Displacer Material S, H, C, R, M and T:

| | |
|--|---|
| 300 mm (12 in) to 3000 mm (118 in) without partitioning | K |
| 3001 mm (118 in) to 6000 mm (236 in) One partition point | L |
| 6001 mm (236 in) to 9000 mm (354 in) Two partition points | M |
| 9001 mm (354 in) to 12000 mm (472 in) Three partition points | N |
| 12001 mm (472 in) to 15000 mm (591 in) Four partition points | O |

MATERIAL AND LENGTH OF THE SUSPENSION: (Length "b") (d)

| | | |
|---|-----|----|
| 316L / 1.4404 / ... Standard length of Suspension | (b) | S1 |
| 316L / 1.4404 / ... Customized Suspension Length | (c) | S2 |
| 321 / 1.4541 Standard length of Suspension | (b) | H1 |
| 321 / 1.4541 Customized Suspension Length | (c) | H2 |
| Hastelloy C Standard length of Suspension | (b) | C1 |
| Hastelloy C Customized Suspension Length | (c) | C2 |
| Inconel Standard length of Suspension | (b) | I1 |
| Inconel Customized Suspension Length | (c) | I2 |
| Monel Standard length of Suspension | (b) | M1 |
| Monel Customized Suspension Length | (c) | M2 |
| Titan Standard length of Suspension | (b) | T1 |
| Titan Customized Suspension Length | (c) | T2 |

(continued on next page)

MODEL CODES 204DE (continued)**OPTIONS:**

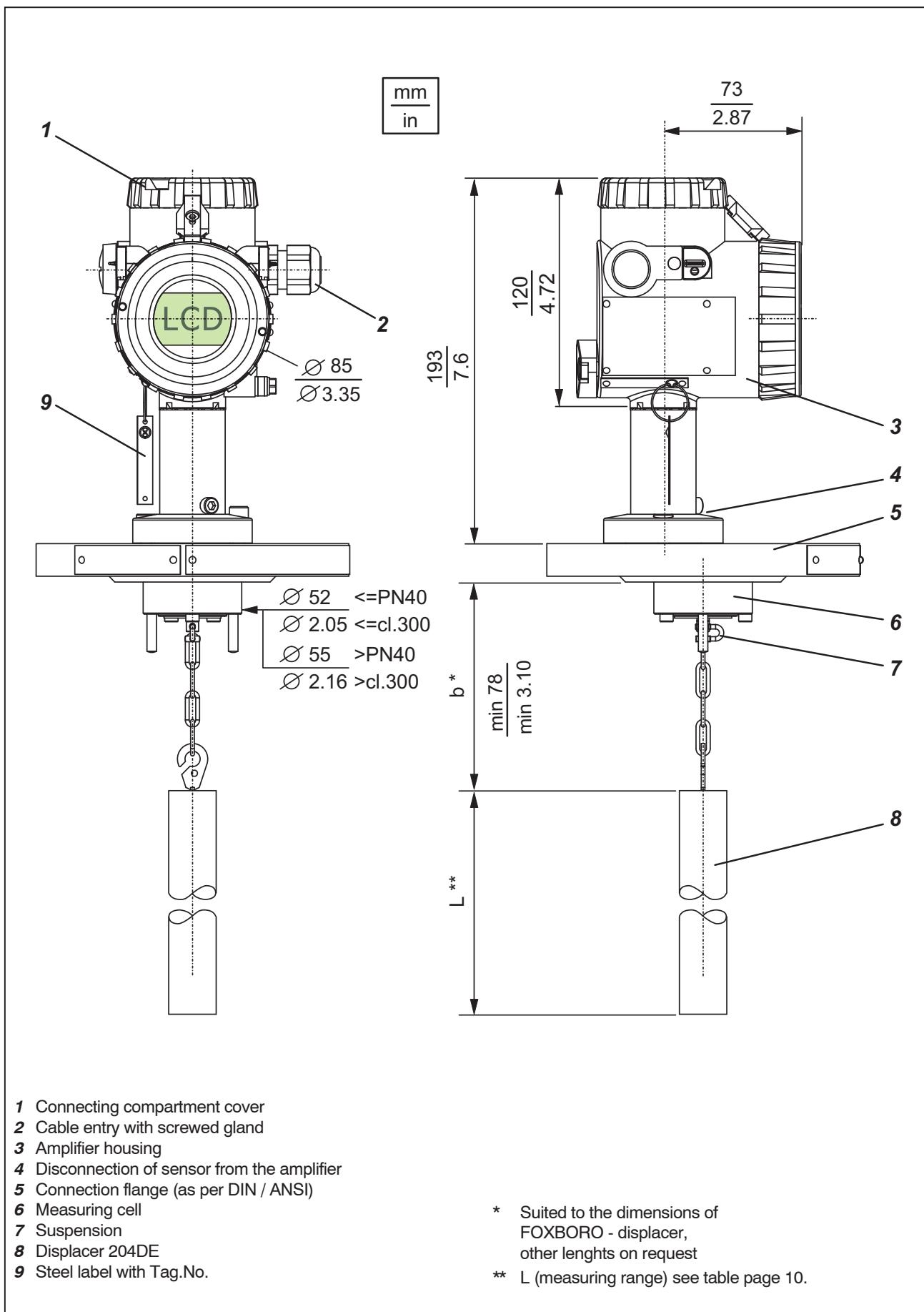
| | |
|--|----|
| For application in Zone 0 (Additional grounding rope) (not available with Displacer Material: P) | -E |
| Damping Spring (Mat. 1.4310, max. 250 °C (482 °F)) (f) | -D |
| Damping Spring (Mat. HC, max 350 °C (662 °F)) (f) | -C |
| Free of oil and fat. | -O |
| Density difference > 300 kg/m ³ (a) | -K |
| Tag No. Labeling Stainless Steel Label Fixed With Wire (Text required). | -L |

Certificates

| | |
|---|----|
| EN 10204-2.1 Certificate Of Compliance | -1 |
| EN 10204-3.1 Inspection Certificate Of Process Wetted Material (not available with Displacer Material: P and O) | -3 |
| PMI - Test (not available with Displacer Material: P and O) | -5 |

- (a) Upper and Lower Medium Density required (at operating temperature)
- (b) Only in connection with Modelcode 204DC
- (c) Exact length required (Contact face of flange to upper end of displacer)
- (d) +/- 8 mm (+/- 0.3 inch)
- (e) On ECEP request
- (f) Required for 244LD with Option -G
- (g) Only with PRESSURE RATING: D. Consult factory if pressure rating is F or G
- (h) Option K required

DIMENSIONS 244LVP with Displacer Element 204DE



Life Is On

Foxboro
by Schneider Electric

Invensys Systems, Inc.
38 Neponset Street
Foxboro, MA 02035
United States of America

schneider-electric.com

Global Customer Support
Toll free: 1-866-746-6477
Global: 1-508-549-2424
Website: <http://support.ips.invensys.com>

Copyright 2010-2016 Invensys Systems, Inc.
All rights reserved.

Invensys, Foxboro, and I/A Series are trademarks
of Invensys Limited, its subsidiaries, and affiliates.
All other trademarks are the property of their
respective owners.

DOKT 556 882 022~1
FD-PSS-L-02-EN

0316